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10 CFR 50.73

PNP 2019-012

February 28, 2018

ATTN: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: LER 2019-002-00 - Automatic Reactor Trip and AFW System Actuation Due to the Loss of Power to the RPS BD matrix

Palisades Nuclear Plant
NRC Docket 50-255
Renewed Facility Operating License No. DPR-20

Entergy Nuclear Operations, Inc., hereby submits the enclosed Licensee Event Report (LER), 2019-002-00, for the Palisades Nuclear Plant. The LER describes an automatic actuation of the reactor protection system and an automatic actuation of the auxiliary feedwater system. The occurrence is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A).

This letter contains no new commitments and no revisions to existing commitments.

Should you have any questions concerning this report, please contact Mr. Jeffery Hardy, Regulatory Assurance Manager, at (269) 764-2011.

Respectfully,

A handwritten signature in blue ink, appearing to read "JAH", with a large, stylized flourish extending from the end.

JAH/mrp

Enclosure: LER 2019-002-00 - Automatic Reactor Trip and AFW System Actuation Due to the Loss of Power to the RPS BD matrix

CC Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC

Enclosure

PNP 2019-012

LER 2019-002-00, Automatic Reactor Trip and AFW System Actuation Due to the Loss
of Power to the RPS BD matrix

3 Pages Follow



LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 03/31/2020

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. Facility Name PALISADES NUCLEAR PLANT	2. Docket Number 05000255	3. Page 1 OF 3
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4. Title Automatic Reactor Trip and AFW System Actuation due to the Loss of Power to the RPS BD matrix

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Rev No.	Month	Day	Year	Facility Name	Docket Number
01	09	2019	2019	- 002	- 00	02	28	2019	Facility Name	Docket Number
										05000
									Facility Name	Docket Number
										05000

9. Operating Mode	11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)			
1	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
10. Power Level 100	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(ii)
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(iii)
		<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> Other (Specify in Abstract below or in NRC Form 366A)	

12. Licensee Contact for this LER

Licensee Contact Jeffery Hardy, Regulatory Assurance Manager	Telephone Number (Include Area Code) 269-764-2011
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13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable To ICES	Cause	System	Component	Manufacturer	Reportable To ICES
X	JD	CAP	S565	Y	X	JD	JX	T032	Y

14. Supplemental Report Expected

☐ Yes (If yes, complete 15. Expected Submission Date) ☒ No

15. Expected Submission Date

Month	Day	Year

Abstract (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On January 9, 2019, maintenance personnel were performing a calibration of NI-6, "Power Range Safety Channel." The plant was in mode 1 at 100% power. At approximately 10:28 EST, maintenance personnel removed the panel on EC-06, "Reactor Protection System (RPS) cabinet," and observed an arc in the vicinity of incoming AC power. It was immediately observed that the entire RPS B channel had lost power. Approximately six minutes after the loss of power to RPS B channel, the reactor tripped. Following the reactor trip, it was identified that the RPS D channel matrix BD power supply was not lit, indicating no output.

The required safety systems and shutdown equipment performed as expected, resulting in an uncomplicated trip. The condition was reported on January 9, 2019 (Event Number 53819) in accordance with 10 CFR 50.72(b)(2)(iv)(B) and 10 CFR 50.72(b)(3)(iv)(A) for both a valid reactor protection system (RPS) actuation and an auxiliary feedwater actuation (AFW).

This event is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) as a condition that resulted in a valid actuation of both the RPS and the AFW.

The cause was attributed to shorted capacitors in the B RPS cabinet and a blown input fuse to the RPS D channel BD matrix power supply. Corrective actions were taken to replace the capacitors with insulated capacitors, and to replace the RPS D channel BD matrix power supply and fuse.

U.S. NUCLEAR REGULATORY
COMMISSIONLICENSEE EVENT REPORT (LER)
CONTINUATION SHEET

(See NUREG-1022, R.3 for instruction and guidance for completing this form
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

APPROVED BY OMB: NO. 3150-0104

EXPIRES: 3/31/2020

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
PALISADES NUCLEAR PLANT	05000-255	YEAR	SEQUENTIAL NUMBER	REV NO.
		2019	- 002	- 00

EVENT DESCRIPTION

On January 9, 2019, the plant was in mode 1 at 100% power. Maintenance personnel were performing RI-62B, "Power Range Safety Channel Alignment- Channel B." Part of this surveillance requires removal of a bottom panel [PL] on the drawer while it is pulled out of the RPS cabinet [CAB]. During the removal of this panel at 10:28 EST, maintenance personnel heard and observed an arc in the vicinity of the incoming AC power. Immediately, the entire RPS B channel lost power. Approximately six minutes after the loss of power to RPS B channel, the reactor [RCT] automatically tripped. The trip was uncomplicated with all rods fully inserted. The auxiliary feedwater system (AFW) actuated as designed in response to steam generator [SG] water levels.

Troubleshooting was performed to determine the cause of the event. The delay between the initial loss of power to the RPS B channel and the reactor trip is indicative of two separate failures. The first failure was a short that tripped the RPS B breaker [BKR] while removing the bottom panel during surveillance testing. The leads of the capacitors [CAP] that were connected to the line and neutral wires were not insulated and were in close proximity to each other. During the removal of the drawer's bottom cover, the disc capacitors moved slightly such that the non-insulated leads on each of the two capacitors touched, causing the short circuit that tripped the RPS B breaker.

The second failure occurred approximately six minutes after the loss of the B channel power. Inspection of the RPS D channel indicated that the BD matrix power supply [JX] was not lit; indicating it had no voltage output. The RPS D channel BD matrix power supply experienced a subcomponent failure, resulting in an overcurrent condition and loss of power output. There were no other structures, systems, or components (SSCs) that were inoperable at the time that contributed to the event.

This condition is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) as a condition that resulted in a valid actuation of both the RPS and the AFW.

Corrective actions were taken to replace the capacitors in the B RPS cabinet with insulated capacitors and replace the RPS D channel BD matrix power supply and fuse [FU]. Operability was restored and the plant returned to service on January 11, 2019.

Energy Industry Identification System (EIIIS) codes and component codes are identified in brackets above.

CAUSE OF THE EVENT

The direct cause of the loss of all power to the RPS BD matrix was the shorted capacitors (RPS B channel) and blown input fuse to the RPS D channel BD matrix power supply.

Loss of all power to the RPS BD matrix resulted in the four BD matrix relays de-energizing. This interrupted power to the four clutch power supplies causing all control rods to insert, tripping the reactor per RPS design.

U.S. NUCLEAR REGULATORY
COMMISSIONLICENSEE EVENT REPORT (LER)
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PALISADES NUCLEAR PLANT	05000-255	YEAR	SEQUENTIAL NUMBER	REV NO.
		2019	- 002	- 00

ASSESSMENT OF SAFETY CONSEQUENCES

The safety significance of the event was low. There were no consequences with regard to the safety of the public, nuclear safety, industrial safety, or radiological safety for this event. Loss of power within the RPS matrix is evidenced by alarms and loss of indication on the RPS matrix panel. Operators are trained to recognize these conditions and manually trip the reactor, if automatic RPS actuation does not occur.

CORRECTIVE ACTIONS

The RPS B channel capacitors were replaced with insulated capacitors. The remaining four range channels were inspected and verified to have insulated capacitors installed. The RPS D channel BD matrix power supply and fuse were replaced. Both the RPS D channel BD matrix power supply and fuse were sent to the vendor for failure evaluation. The results of the vendor failure evaluation will be used to determine any additional actions.

PREVIOUS OCCURENCES

A review of the Palisades Nuclear Plant (PNP) corrective action program database for events involving NI-6 and capacitors was completed. No similar events for PNP were previously identified.

A PNP corrective action database review was completed for RPS power failure events. RPS has a history of power supply failures including matrix power supplies. Due to this history, the RPS matrix power supplies were all replaced in early 2013. One matrix supply failed approximately two months after replacement with no impact on the plant as the other matrix power supply carried the load. The failed power supply was sent for detailed vendor analysis, though no specific cause was determined.